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Effects of ^{3}He Addition on Implosion of Deuterium-Tritium (D-T) Capsules on OMEGA

H. W. Herrmann, J. M. Mack, C. S. Young, J. Langenbrunner, D. C. Wilson, J. A. Cooley, L. Welser-Sherrill, S. C. Evans, T. J. Sedillo, G. A. Kyrala
Los Alamos National Laboratory, New Mexico

C. J. Horsfield, D. W. Drew
Atomic Weapons Establishment, United Kingdom

E. K. Miller
National Security Technologies, LLC, Special Technologies Laboratory, California

V. Yu Glebov
Laboratory of Laser Energetics, University of Rochester, New York

ABSTRACT

Glass (SiGDP) capsules were imploded on the OMEGA laser to look for anomalous degradation in yield (i.e., beyond what is predicted) with ^{3}He addition similar to the "factor of two" degradation previously reported by MIT (Rygg et al., Phys. Plasmas 13, 2006) at a 50% ^{3}He atom fraction. We did not see a significant anomalous degradation. The cause of the "Rygg" anomaly is as of yet unexplained, but differences in gas mixture (D-T vs. D_2) or shell parameters (glass vs. plastic, diameter and wall thickness) may be responsible for the absence of this anomaly in the recent data. In addition, a short laser pulse (600 ps) was used to temporally separate shock and compression yield components in order to investigate mix. Previously, anomalously low compression yield had been observed when imploding glass targets containing 10 atm D-T with 10 kJ of laser. This effect was not seen in the recent data with 5 atm D-T and 15 kJ and the resulting γ and *n* burn histories were in good qualitative agreement with predictions for ^{3}He addition.

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